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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,798	12/11/2003	Noboru Mikami	402906/SOGA	5877
23548	7590	07/21/2005	EXAMINER	
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			WILSON, CHRISTIAN D	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 07/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/732,798

Applicant(s)

MIKAMI ET AL.

Examiner

Christian Wilson

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12112003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of claims 7 – 9 in the reply filed on June 23, 2005 is acknowledged.
2. Claims 1 – 6 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 23, 2005.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obeng *et al.* in view of Gracias *et al.*

Regarding claim 7, Obeng *et al.* (US 6,323,131) teaches an underlayer film 18 for copper 20 on a substrate 12 where the underlayer film is formed of a  $(R_1R_2)N - (R)_n - Si$  to a substrate via an Si-O bond where  $R_1$  and  $R_2$  represent an alkyl group and R represents an alkylene group or an aromatic ring where n represents an integer from 1 to 6 [column 2, lines 60-67; column 3, lines 1-20]. Obeng *et al.* does not discuss phosphorous (P) in place of nitrogen (N). Gracias *et al.* (US 6,905,958) teaches an underlayer film where a phosphine is used in the self-assembled monolayer film [column 3, lines 30-35]. It would have been obvious to one of ordinary skill in the art to use P in the device of Obeng *et al.* since Gracias *et al.* teaches that these materials readily form bonds to copper layers.

Regarding claim 8, it is noted that product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). In this instance, Obeng *et al.* as modified by Gracias *et al.* teaches all the structural limitations of claim 8. Therefore, the process limitations add no patentable distinction between the claimed device and the prior art.

Regarding claim 9, Obeng *et al.* teaches a substrate **12**, an underlayer film **18** for copper, a wiring film **20** formed of copper, where the underlayer film is formed of a  $(R_1R_2)N - (R)_n - Si$  to a substrate via an Si-O bond where  $R_1$  and  $R_2$  represent an alkyl group and R represents an alkylene group or an aromatic ring where n represents an integer from 1 to 6 [column 2, lines 60-67; column 3, lines 1-20]. Obeng *et al.* does not discuss phosphorous (P) in place of nitrogen (N). Gracias *et al.* teaches an underlayer film where a phosphine is used in the self-assembled monolayer film [column 3, lines 30-35]. It would have been obvious to one of ordinary skill in the art to use P in the device of Obeng *et al.* since Gracias *et al.* teaches that these materials readily form bonds to copper layers.

5. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

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***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches method of using self-assembled monolayers to form barrier layers in a copper via.

7. A copy of the search history is enclosed.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886. The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christian Wilson, Ph.D.  
Primary Examiner  
Art Unit 2891

CDW